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[redacted]
P. O. Box 8031
Southwest Station
Washington, D. C. 20024

Declass Review by NGA.

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[redacted]

Subject: Additional Change of Scope Justification

Gentlemen:

25X1 In accordance with discussions held on December 17, 1965, [redacted] is herewith forwarding the requested additional Change Of Scope Justification.

If we can be of any further assistance, please do not hesitate to contact us.

Yours truly,

GOVERNMENT PROGRAMS GROUP

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[redacted]
Supervisor, Contract Administration

TKL/

Copies of attachments forwarded

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[redacted]

authorized person is prohibited by law."

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ADDITIONAL

CHANGE OF SCOPE JUSTIFICATION

I. Transport

A. Scope is increased as a result of the following new additions to the specifications:

Paragraph 1.1

Format size increased from 2.25 inches to 5.0 inches.

Paragraph 2.1.3

Addition of a Slew Control, a Frame Counter, a Footage Counter, and Frame Separation Sensing and Detection.

B. Scope is decreased as a result of removal of film coding. See "Removal of Coding."

Justification:

Paragraph 1.1

Format size increase from 2.25 inches to 5.0 inches. This change came early in the program and initially was not considered as a change of scope, since format length was simply a function of the code placement. The mask was not yet designed and could, therefore, be accommodated to the change at no cost. Once coding was removed and frame separation sensing was substituted, it now becomes necessary to photoelectrically sense across the entire width of the film, where previously sensing was accomplished along one longitudinal edge. This introduced complications and mechanical interferences because of the scanning bag and light source. In addition, it now becomes

necessary to store and eliminate some of the pulses produced by the 2.25 inch frame boundaries and required further modification to control circuits.

The mask has been designed for the 5" formats; and, therefore, it would be costly to convert back to 2.25 inch formats. Another reason for not converting to the smaller format is the complication imposed upon the frame edge detection system, which must be located as far from the gate as possible because of multiple interferences to completed designs.

This change accounts for approximately 6 per cent of the total change.

Paragraph 2.1.3

Slew Control A joy-stick control must be designed, velocity servo drive must be designed and coupled to the vacuum capstan so that the operator may move the film bi-directionally into the viewer under complete manual control. Both high and low speed control is required. This was not a requirement in the original specifications.

This change accounts for approximately 18 per cent of the total change.

Frame and Footage Counters

Originally the machine was to be tape or operator-controlled to select frames based on a binary code to be placed on the film.

Since no code is now used, it is necessary to sense the frame edge boundaries and count frames by means of pulses in predetermined electronic and electromechanical counters. These must be bi-directional counters capable of being pre-set to a zero reference.

In the case of continuous strip photography, in which there are no frame separation boundaries, it becomes necessary to measure film displacement and to convert the frame counters to footage counters.

This amounts to a complete re-evaluation and design of the entire printer sense and compare logic system, which was developed during the Feasibility Study and early Breadboard Phase for code identification.

This change accounts for approximately 46 per cent of the total change.

Frame Edge Sensing

New photosensors, light sources, amplifiers and optics must be investigated and breadboarded for use in frame edge detection. The sensors and circuits used in Printer 1 are not directly adaptable because of the much higher printer speed requirement and the need for bi-directional transport. A foolproof method must be developed to prevent the sensing of clear areas within the frame, or of missing unclearly defined frames. In addition, a warning and safety scheme must be developed to warn the

the operator in the case of missing frames.

This change accounts for approximately 30 per cent of the total change.

II. Viewer and Mask

Change of scope as a result of the following addition to the specifications.

Paragraph 2.27

Viewer addition

Paragraph 2.5

Mask along width of the film.

Justification

Paragraph 2.27 Viewer addition

As a result of the addition of a requirement for viewing the negative film prior to positioning within the gate, the completed industrial and human factors concepts and designs developed during the Feasibility Study and Breadboard Phase have been scrapped. New machine configuration and human factors studies were initiated, and revisions were made in the transport, gate and frame, in order to fit the components within the stated package.

Various concepts were breadboarded in an attempt to minimize the effects of repositioning of mechanical components. Among

These were red-light optics, infra-red image converters, and closed loop T.V. Systems. An analysis of the red sensitivity of the various duplicating films was made, backed up by spectrum analysis of various filters, and darkroom testing of films to determine how long these could be exposed to red light without fogging. Manufacturers' data did not extend into the red and infra-red regions, and indications of extended red sensitivity resulted in fogging of the raw stock under conditions of prolonged viewing in the printer gate.

Paragraph 2.5 Masking Along Width of Film

The length mask was designed in concept, and the glass platen was designed with a permanent strip mask at the exposing lamp edge position. These designs, developed during the Feasibility Study, had to be discardedas a result of the additional mask requirements. Control of the new masks by the operator could have effects upon the industrial machine design and human factors operations. Modifications to the platen and gate are anticipated to incorporate the new mechanisms required.

III. Electronic Controls

Solid state circuitry utilizing a unique micrologic design was originally developed because of the speed of code sensing and the use of external tape programming.

Because of the elimination of the coding and external tape programming features, the previously designed logic elements are not compatible with the frame sensing circuits. Complete redesign of the control panel was necessary, including re-study [redacted] selection of new components and changes in industrial design concepts. The previous concepts established during the six-month feasibility study were not applicable for the most part.

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Designs for the heavy-duty motors and mounts originally required for the 1000 foot spools were eliminated. Also eliminated were the time delay circuits required originally for the variable printing rate specification, paragraph 2.6. Packaging concept for micrologic circuits had to be redesigned to adapt the revised circuit elements.

IV. Film Coding

The film coding program consisted of three phases: Phase 1, a study phase, consisted of investigation of techniques for applying a code to film negatives, definition of a frame identification format, investigation of likely transducers and light sources, and development of a coding logic system.

Phase 2, a breadboard and test phase, consisted of purchase of test photosensors and light sources; design and fabrication of a code-reader test fixture; design and procurement of a simulated coded film for test; and development of the electronic circuits for the test rig.

Phase 3, the prototype design and fabrication phase consists of: finalizing of drawings, fabrication of parts, assembly and test. Phase 1 was completed with the Feasibility Report delivery, Phase 2 was more than 80 per cent complete when the change of scope was initiated. Essentially, Phase 3 and a portion of Phase 2 is credited.

V. Color Printing and Paper Accommodation

There were no expenditures made under the contract on color printing and paper accommodation, and the entire effort is therefore credited.

VI. R.F.I. Removal

The RFI Program consisted of:

1. Basic Interference Control Plan per MIL I-11748.
2. Liaison during component and technique selection and design.
3. Compilation of catalog data.
4. Determination of power distribution and grounding.
5. Determination of filter requirements.
6. Prototype liaison.

Part 1 was developed during the Feasibility Study. Parts 2 through 5 were started during the Breadboard Phase, and were 30 per cent completed.

Seventy per cent of the Breadboard effort and the entire prototype effort are therefore credited.

VII. Interior Environment

Originally, temperature and humidity requirements for the interior of the equipment were to be satisfied by air conditioning of the printer. The revised specification (2.3.2) spells out a room environment for the machine in which air conditioning of the printer is not required. The entire effort is therefore credited since no effort was expended during the Feasibility and Breadboard Phases.

VIII. Additional Industrial Design

The revised specification requires additional industrial design services [redacted] to provide re- 25X1
design of the cabinet based on the need for a viewer.

AGENDA

25X1 [redacted] Meeting --------Washington, D.C.

1. Introduction

   Why we are here--Brief

   Programs - Identify printers

2. Tech Specs

   a. Printer 1 Specs and objectives

   b. External Configuration -

   c. Description of dodging systems, etc.

   d. Printer 2 Specs and objectives

   e. External Configuration

   f. Description of dodging systems, etc.

3. Characteristics and Performance of both Printers

   Present technical status

   Printer 1 o per cent complete

   Printer 2 Stopped in October

4. Program History

   Length of Programs - delivery

   Change of Scope

5. Cost Status

   a. Printer 1 - additional cost details

   b. Printer 2 - additional cost details

   c. Program Summary

   d. Program Status

6. Hardware Demonstration